In the definition of the Marsupials, exception must be taken to the statement that the young are *always* nourished in a pouch ; and when mentioning the occurrence of the group in America no reference is made to *Caenolestes*. Indeed, the account of the whole group is entirely inadequate ; and when the author speaks of the value of American opossum fur, we strongly suspect he had in his mind the product of the so-called opossums of Australia.

Finally, when treating of the Monotremes, the author states that the spiny anteaters are represented solely by *Echidna hystrix* and *E. setosa*. As a matter of fact, these two forms are but local races of a single species whose name is *E. aculeata* ; and the author appears to be totally unacquainted with the very distinct genus commonly known as *Proechidna !*

As already said, we do not intend to criticise in detail the nomenclature employed ; but in the retention of names now discarded by those who have made a special study of the class the author has done his best to put his work out of touch with the present state of science.

In making this statement, we are aware that the author lays stress on the circumstance that he is treating his subject from a biological standpoint. This, however, in our opinion, is no excuse for neglect of the details o classification and nomenclature.

When treating of the adaptation of animals to their environment, the author is always interesting ; and the paragraphs devoted to this part of the subject are, to our mind, the best in the whole fasciculus. R. L.

GOOD AND BAD AIR.

The Carbonic Anhydride of the Atmosphere. By Prof. E. A. Letts, D.Sc., Ph.D., and R. F. Blake, F.I.C., F.C.S., "Scientific Proceedings of the Royal Dublin Society," vol. ix. (N. S.), Part ii. No. 15. Pp. 270. (Dublin : 1900.)

The Air of Rooms. By Francis Jones, F.R.S.E., F.C.S. Pp. 59. (Manchester : Taylor, Garnett, Evans and Co., 1900.)

THE first of these pamphlets would amply justify its publication, if it only served to emphasise the necessity of further investigation into the methods of estimating carbon dioxide in the atmosphere. It is partly experimental, partly bibliographical in character. The authors, finding themselves called upon to make a series of observations on the carbon dioxide of the air, have made a careful study of Pettenkofer's method, and have introduced some necessary corrections, without detracting very much from its simplicity. They take the precaution, suggested by other observers, of preventing the action of the baryta solution on the glass by coating the vessel with a layer of paraffin wax. It may be pointed out that a solution in benzene is more suitable than the melted wax. The thinner film obtained with the solution is less liable to crack. The baryta solution is manipulated very ingeniously out of contact with air. Yet with all these precautions the results show that perfection is far from being attained.

In the set of analyses on page 132 there is a discrepancy between the highest and lowest figures of 10 per cent., in another set on the same page the difference amounts to 17 per cent., and on the next page to 20 per cent.

It seems superfluous to introduce the third decimal into the result when the experimental error affects the first decimal place, and equally unnecessary to make a correction for aqueous vapour, which only amounts to about one and a half per cent. on the volume of carbon dioxide, as against 10 per cent. or thereabouts from experimental error.

The authors omit to mention how long the baryta remains in contact with the sample of air. This is an important factor which should not be neglected, for there can be no doubt that the absorption of carbon dioxide by the baryta proceeds at a rapidly decreasing rate and that the final traces of the gas may take many hours to disappear.

The book is full of useful information, drawn from a variety of sources, the collection of which must have cost the authors no little trouble. At the same time, one is inclined to think that the value of the information would have been enhanced if they had gone another step and made a critical selection from the mass of analyses which they reproduce, for the figures cannot all be equally trustworthy, and many of them must be entirely illusive.

The second pamphlet relates to domestic hygiene. It treats of the effects produced on the air of rooms by the use of gas, coal and electric light for heating and lighting purposes. The effect is determined by estimating the amount of carbon dioxide by Pettenkofer's method, and by exposing a layer of permanganate solution to the air and finding the quantity of the salt reduced.

Mr. Jones, unlike the authors of the previous pamphlet, is not troubled by misgivings about Pettenkofer's method, except in the matter of the baryta attacking the glass. He therefore substitutes lime-water as the absorbent, apparently unaware of the fact that its effect on glass is precisely of the same character, which may be easily observed by placing very dilute lime-water coloured with phenolphthalein in any glass vessel ; in a day or two the colour will be completely discharged. As the results here are only required for comparison, great accuracy is not requisite, and the ordinary method may be relied on. The results of the permanganate method will scarcely serve to recommend it. We find, for example, that in two experiments made on July 21 two-thirds the quantity of permanganate was reduced in the one case in double the time. As Mr. Jones points out, the quantity of dust may affect the rapidity of reduction. If this is the case, effective ventilation will produce disturbance of the air and movement of dust as well as local currents from gas-jets, and it will be difficult to differentiate the two. The results which Mr. Jones obtains are precisely what might be anticipated if we take into account the fact that a coal fire produces an enormous air current through a room near the floor level, whereas a gas fire usually only serves to carry away its own products of combustion. Mr. Jones finds that the purest atmosphere is maintained with a coal fire and electric light ; then follow gas fire with electric light, coal fire and gas light, and gas fire and gas light. The worst effect is produced by an open gas cooking stove without flue. The author shows, moreover, that

gas light is more deleterious than a gas fire. That the worst atmosphere exists at the top of a room where the heated products of combustion accumulate is only natural. That is the reason, it is to be presumed, why the topsy-turvy method of ventilating at the floor level with a coal fire is the one most generally in use.

J. B. C.

OUR BOOK SHELF.

Lamarckiens et Darwiniens; Discussion de quelques Théories sur la Formation des Espèces. Par Félix Le Dantec, Chargé du Cours d'Embryologie générale à la Sorbonne. Pp. 191. (Paris: Félix Alcan, 1899.)

THIS is a well-intended, but scarcely adequate, endeavour to reconcile the Darwinian with the Lamarckian conception of evolution. While admitting the principle of natural selection as an important factor in organic development, the author seeks to explain the origin of species mainly on a Lamarckian basis. It may be doubted whether his suggested compromise will commend itself to either party. We are of opinion, *pace* M. Le Dantec, that Darwin's estimate of Lamarck was perfectly just; and that if Lamarckian views are to prevail, it must be by dint of facts and arguments other than those adduced by Lamarck himself. The present volume contains nothing approaching a demonstration of the inheritance of acquired characters; and until this is forthcoming, the Lamarckian fabric must be held to lack foundation. It is curious that the author, who has undoubtedly grasped the principle of natural selection, should not see how groundless is his hesitation in applying it. A reason for this failure is doubtless to be found in his tendency to deal with cases of adaptation as if they were ready made; he has apparently not taken into account the evidence of gradual approximation to the completely adapted condition. How, he asks, can chance have produced the aspect of *Kallima*? A study of allied forms might have shown him that his question was wide of the mark. On the crucial subject of mimicry and protective resemblance, this strange reluctance to carry an admitted principle to its legitimate end produces especially unfortunate results. M. Le Dantec is constrained, not only to suppose that the white of Arctic animals may be a direct result of the colour of their surroundings "as in Poulton's experiments on caterpillars," but to assume the conscious adoption of appropriate habits on the part of protected organisms. It would seem that not much is here gained by the abandonment of the Darwinian standpoint. In the last few chapters of the book the author expounds his "biochemical" theory of heredity, but without throwing any new light on the familiar difficulties of the subject. It is open to any one to proclaim his faith in the essentially chemical character of all kinds of protoplasmic activity, but the fact remains that among these phenomena there is a residuum which does not easily relate itself with what is known of the properties of other kinds of matter. This is where the problem was found by M. Le Dantec, and this is where he has left it. F. A. D.

Helen Keller: Souvenir. Pp. 65. (Washington: Volta Bureau, 1899.)

THE achievements of Miss Helen Keller bear striking testimony to what it is possible to accomplish in the education of the deaf. Though totally blind, as well as deaf, from infancy, she succeeded in passing the examination for admission into Radcliffe College, Harvard University, a year ago. In honour of this remarkable result, the Volta Bureau, which exists for the increase and diffusion of knowledge relating to the deaf, has published this souvenir, containing an account of her career, contributed by Dr. A. Graham Bell, Miss A. M. Sullivan and other instructors, and herself.

Dr. Bell considers that the lesson taught by Miss Keller's case is that books should be used at the earliest stages of a deaf or blind child's education. "I would have a deaf child read books in order to learn the language," he remarks, "instead of learning the language in order to read books." Miss Sullivan describes how she gave Miss Keller books printed in raised letters long before her pupil could read them. Words of particular shapes were associated with particular objects and actions, and in a comparatively short time Miss Keller thus acquired an exceptional knowledge of the English language.

Miss Sullivan employed the manual alphabet exclusively as a means of communication at the commencement of the child's education. She adopted the method of talking to Miss Keller just as she would to a seeing and hearing child, spelling into her hands the words and sentences she would have spoken to her if she could have heard, in spite of the fact that at first much of the language was unintelligible to the child. Three years after beginning to communicate by means of the manual alphabet, Miss Keller began to try to imitate sounds. Some deaf children are taught to speak by imitating the movements of the lips of the teacher. Miss Keller could not see these movements, but she could feel them by touching her teacher's lips, and she was soon able to reproduce the same sounds and articulate words.

How Miss Keller was prepared for admission into Radcliffe College, the entrance examination of which is exactly the same as that of Harvard College, is described by her instructors, and Miss Keller gives a simple chronological account of her studies. The whole statement is a remarkable narrative, and will be of the deepest interest to teachers of the deaf and students of psychological development.

The Psychology of Reasoning. By Alfred Binet. Translated by Adam Gowans Whyte. Pp. 191. (Chicago: Open Court Publishing Company. London: Kegan Paul and Co., Ltd., 1899.)

THIS is a translation of the second edition of M. Binet's well-known book, the main object of which is to show the essential similarity of perception and reasoning, and to illustrate the nature of the latter by our more complete knowledge of the former, especially with reference to the part played in perception by mental images. When the "Psychologie du raisonnement" first appeared, the more or less novel facts about mental imagery discovered by Galton and Charcot were described in a clear and interesting manner, and this feature remains without alteration. In fact no appreciable alterations have been made in the present edition, even when called for; thus Parinaud's evidence in favour of the central seat of after-images is repeated, although generally acknowledged to rest on a misconception of the relations between the two eyes. The book is full of interesting psychological facts; but unfortunately most of these are drawn from hypnotic experiments, and Binet does not yet appear to have recognised that, owing to the influence of unconscious suggestion, it is very dangerous to found psychological theories on such a basis.

Nevertheless M. Binet's work should be very welcome in an English form, and this the more so that the translation has been very well done.

Electric Batteries: How to Make and Use Them. Edited by P. Marshall. Pp. 63. (London: Dawbarn and Ward.)

THE principal forms of primary electric batteries are described in this little book, and some serviceable details are given concerning their working and use. The book will be particularly helpful by amateur electricians; and students of electricity will find in it some information not usually given in the text-books.